

CLAIMS*Add A27**Add B17*

1. A ferrohydrostatic separation method in which a ferrofluid is used to separate materials of different density, the method comprising the step of controlling the apparent density of the ferrofluid by means of a vertically orientated magnetic field generated by a C-dipole, open dipole (O-dipole) or split pair electromagnet or permanent magnet.
2. A method according to claim 1 wherein a required magnetic field pattern in the vertical direction is achieved, in the case of a C-dipole electromagnet, by appropriate design of the magnetising coils on upper and lower legs of the Cdipole and/or by controlling the relative polarity of electrical current flowing through these coils and/or by appropriate shaping of the C-dipole tips.
3. A method according to claim 1 wherein a required magnetic field pattern in the vertical direction is achieved, in the case of a split pair-electromagnet, by appropriate design of the magnetising coils on upper and lower members of the split pair and/or by controlling the relative polarity of electrical current flowing through these coils and/or by appropriate shaping of the tips of the upper and lower members.
4. A method according to claim 1 wherein a required magnetic field pattern in the vertical direction is achieved, in the case of an O-dipole electromagnet, by appropriate shaping of the steel core of the magnet and/or by appropriate design of the magnetising coil.

5.

A method according to any one of claims 2 to 4 wherein the required magnetic field pattern includes the provision of a constant magnetic field gradient.

6.

A method of separating materials of different density comprising introducing the materials into a ferrofluid, using a C-dipole, O-dipole or split pair magnet to generate a magnetic field to control the apparent density of the ferrofluid to a value between the densities of the materials, and separately recovering materials which sink and float in the ferrofluid

7.

A ferrohydrostatic separation apparatus for separating materials having different densities, the apparatus including a separation chamber for accommodating a ferrofluid into which the materials can be introduced, and a C-dipole, O-dipole or split pair magnet adjacent the chamber for generating a magnetic field to control the apparent density of the ferrofluid.